Permutations and Combinations Practice Quiz I   <u>26</u>   Name:_____

1. In a particular jurisdiction, license plates consist of **any three non-repeating letters** (where the first of which is not the letters "I" or "O"), **followed by one of the digits** 6,7, or 8, **followed by any two digits**. (Repetition of digits is ok!). Determine the total number of possible license plates.

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2. Consider the word "SASKATCHEWAN". How many ways are there to…
(a) Arrange all of the letters in the word

(b) Arrange all of the letters in the word – if the first two letters must be "KW" *(in that order)*

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(c) Arrange all of the letters in the word – if all of the S's must be kept together.

(d) Arrange all of the letters in the word – if it must begin with exactly two A's.

3. An advertising executive is designing an ad for a jewelry company. The company has several distinct items it wishes to display in a single row across the bottom of the page; a diamond ring, a rhinestone ring, a sapphire ring, a floral ring, a charm bracelet, a sliver bracelet, and a pendant necklace.

How many ways can these items be displayed if:
(a) The rings must together on the left side of the row, and the bracelets must be together on the right side.

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(b) All of the rings and all of the bracelets must be together.

(c) Only the rings must be together.

(d) The rings must alternate with the other pieces.

4. Kate is organizing her linen closet. She has 8 identical towels; five are white, one is green, and two are blue. Determine the number of way she can stack the towels, one on top of the other in each scenario:

(a) If the top and bottom towel must be white.

(b) If the blue towels are not to be together.

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5. In the NHL's Central Division, there are seven teams, the top three of which are guaranteed to make the playoffs. Determine the number of total possible groups of three teams that could make the playoffs, if the Winnipeg Jets are known to be one of the non-playoff teams.

<u>1</u>

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6. At the conclusion of a sales seminar, all of the attendees shook hands – with a total of 105 handshakes taking place. Assuming each attendee shook the hand of each other attendee, and no attendees shook hands more than once, set up and algebraically solve an equation to determine the number of attendees there were.

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7. Evaluate without a calculator *(Show all steps/ reasoning)*: $_{50}C_{48}$

1

8. From a group of 8 girls and 6 boys, a student council committee of exactly five members must be formed. How many ways can this committee be formed if:
   (a) There are no restrictions

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   (b) One of the girls, Penelope, must be in the committee

   (c) The committee must consist of at least one girl. *(Disregard the Penelope restriction described above)*

9. A wrestling coach has 8 wrestlers, and from this group must select three to attend city finals. How many ways can this be done if (because of a personality conflict) two of the boys – Omar and Sven – cannot both go together.

1

10. From a standard deck of 52 cards, a 5-card poker hand is dealt. Determine the number of 5-card hands that would include:
    (a) Two kings, two jacks, and an ace

    (b) Three-of-a-kind - Three kings

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    (c) Any four-of-a-kind

11. From the letters in the word "TOFIELD" determine:
    (a) The number of 4-letter arrangements that can be made, consisting of "*vowel, vowel, consonant, consonant*". (in that order)

    (b) The number of ways any two vowels and two consonants can be selected. (not arranged!)

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    (c) The number of ways each of the groups of four letters (from part B) can be arranged.

    (d) Use your result from part (c) to determine the number of possible four-letter arrangements that can be made, consisting of two vowels and two consonants.

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